REB
681

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES
1875 New Hope Street
Norristown, Pennsylvania 19401
Phone: 631-2405

June 21, 1974

Office of Grants Coordination
U.S. Environmental Protection Agency
Region III
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

SUBJECT: Sewerage - Infiltration/Inflow
Certification
Southwest Sewage Treatment Plant
Philadelphia Water Department
City of Philadelphia, Philadelphia County

Gentlemen:

It is hereby certified that the subject project is, in my professional judgment, subject to possible excessive infiltration/inflow as defined in 40 CFR 35.927. It is further certified that:

1. The proposed expansion (to 210 mgd) and upgrading (secondary treatment) of the treatment plant for which the grant application has been made will not be significantly changed by any necessary rehabilitation program to be determined by the Phase II Sewer Survey Evaluation and will be a component part of any rehabilitated system. It should be noted that the basis of design (210 mgd for design year 1990) for the treatment plant was developed to handle all dry weather infiltration/inflow with excess wet weather inflow (storm runoff) being bypassed from the combined sewers via regulator facilities. If the Phase II Study reveals rehabilitation work to be the most cost effective solution, the result would be to extend the design year of the plant possibly 10-20 years based on current projections of growth within the expected service area. Alternately, this "extra" plant capacity for design year 1990 could possibly be used to handle storm water as part of a solution to the City's combined sewer overflow situation.

In addition, if the project is delayed up to several years to complete the Phase II Sewer System Evaluation Survey and possible plant redesign, the result could be that the City would have a smaller capacity treatment plant (due to rehabilitation) at a greater overall cost (due to inflation). Consequently, it is important and felt justifiable from an economic and well as environmental standpoint to prevent any delay in plant construction because of infiltration/inflow studies which can be done concurrent with construction.

2. The grant applicant has submitted the enclosed schedule for conducting a sewer system evaluation survey (Phase II) and conducting any resulting rehabilitation work (Phase III). This schedule covers not only the area within the City of Philadelphia tributary to the Southwest sewage treatment plant, but also those suburban municipalities which presently or will in the near future (i.e., DELCORA) discharge sewage to the City's system which drains to the Southwest sewage treatment plant. No "plan of action" is included at this time, but will be submitted in accordance with the schedule.

3. I am authorized to make the certification on behalf of the Pennsylvania Department of Environmental Resources.

It should be noted that the basis for this determination is primarily found in the report entitled, "Philadelphia Water Department Infiltration/Inflow Analysis", dated June 13, 1974 which is an updated version of Interim Report with the same title dated January 31, 1974. I understand that both of these reports were previously submitted to the E.P.A. by the Philadelphia Water Department; hence, I have not enclosed any copies.

For your reference in reviewing this certification and Infiltration/Inflow Analysis, and the subsequent "Plan of Action", and Sewer System Evaluation Survey Report, I have the following comments as a result noted of my review of the Infiltration/Inflow Analysis:

1. The City notes that the Southwest plant is to be eventually expanded to 285 mgd by design year 2020. However, the Preliminary Design Report only calls for a capacity of 248 mgd by design year 2020 for the present expected service area including Eastern Delaware County or 290 mgd by design year 2020 if "Full" regionalization is achieved.

The extent of regionalization will be determined by the on-going COWAMP Study. My estimate of 10-20 years extension on the design year for a 210 mgd plant should rehabilitation occur was based on the projected flow of 248 mgd by year 2020; consequently, additional flow due to a greater service area would depress the aforementioned 10-20 years extension.

2. My analysis of the Southwest plant for amount of infiltration only, resulted in an estimated infiltration volume of up to 70 mgd (October 9, 1973) with extended periods of time when infiltration reached 50 mgd (October and November 1973). I did not consider April 1-2, 1973, which had extremely high treatment plant flows after no rainfall, which seemed questionable. It should be noted that this analysis was only for the City's sewers. My water usage estimate in the Southwest sewer area was based on 26% of the total water distributed City wide which is the same proportion as the City's sewage flow at Southwest treatment plant to the total City's sewage flow at all three (3) plants during 1973. Of particular significance is the observation that infiltration was apparently greater in the Fall of 1973 than in the Spring of 1973, which is unusual since the ground water table is normally lower in the latter half of the year.

3. The City's infiltration allowance of 2000 gpd/acre seems quite high and would result in a per capita infiltration allowance of about 85 gpd. Based on 2850 miles of sewer and an infiltration allowance of 500 gpd, the average sewer diameter would have to approach 10 feet to equal the City's allowance; which although approved by our Department according to the report was done so about 40 years ago. In addition the only sewers which the City tests for infiltration after construction are interceptors. The smaller sewers are not tested, since the City feels they are adequate due to type of materials used and the TV or manual inspection; however, if the water table is below the sewer when it is inspected, no positive infiltration test is performed.

4. We do wish to note that related to the Infiltration/ Inflow studies is our Department's Order of June 28, 1968 to the Philadelphia Water Department requiring submission of a report on the location and quantity of the combined sewer discharges and the effect of these discharges on receiving water quality. This Order was appealed to the Sanitary Water Board which issued an adjudication April 10, 1969 upholding the Order and requiring submission of the report by April 10, 1970.

To date, the report has not been submitted to our Department, despite several requests, although we understand that the consultant, Watermation, Inc., submitted the completed study to the City in May, 1973.

5. The I/I Analysis only covers the "dry weather" inflows, presumably since combined sewers exist. The Phase II Study should cover all inflows (wet and dry weather) as well as infiltration in the separate areas of the City's sewer system and in the connected suburban municipalities. Certainly, information could be developed from the estimated sixty sub-drainage basins within the City's Southwest service area, possibly the pumping stations, and installed meters at critical locations such as at the point of transition from separate to combined systems.

6. The cost comparisons for determining the most cost effective method of handling dry weather inflows (i.e., subway pumping) and infiltration appear incomplete. No data was submitted on the cost of additional interceptors or larger pumping stations to handle the additional flow (reduced design year) but rather only the treatment cost was compared to the rehabilitation cost. Also, the cost comparison for dry weather inflows includes power and maintenance costs for the pumping stations as part of the reroute alternate; however, the pumping stations appear necessary whether the water is conveyed to a surface stream or a combined sewer.

7. Very limited data was submitted on the presently connected municipalities outside of Philadelphia or the municipalities to be soon connected by the DELCORA pump station. I know certain peak flow problems after rainfall exist at least in some of Delaware County communities and the high (>100 gpd) per capita sewage flows (annual basis) for essentially residential communities tend to substantiate this position.

8. The City's mass balance still covers the entire City sewerage system rather than determining the situation in each of the three (3) major drainage areas tributary to a specific plant. No water usage data within each of the three services areas was submitted although I performed an estimate (see comment #2).

9. A determination should be made as to whether the storm water pumping stations at 22nd and Vine Street and at 26th and Vare Avenues could discharge storm water directly to surface water rather than to combined sewers. Most of the water would eventually go to the surface streams anyway via regulators but less regulator overflow (mixed sewage) would result from such a disconnection.

10. The Phase II Report should breakdown water usage within the Southwest area to ascertain domestic, commercial and industrial usage, and define the present connected population and also volume of industrial wastewater entering the sewer system.

11. It should be noted that the average annual flows would include an inflow component (that which is not bypassed via regulators) as well as the infiltration component. However, this would not be the case when reviewing individual days or periods of time during non-rainfall conditions.

12. What is the normal peaking factor at the Southwest plant when there is no bypassing due to rainfall? What rate of sewage flow can be conveyed by the interceptor system to the Southwest plant (including the proposed DELCORA system) before the excess is bypassed via the regulators?

Should you have any questions relative to this matter, please feel free to call me.

Very truly yours,

Richard L. Hinkle

Richard L. Hinkle
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Bureau of Water Quality Management
Norristown Regional Office

RLH:lm

CC: Division of Management
Services (Marshall Cashman)
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